

## PATENT SPECIFICATION (11)

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## (54) IMPROVEMENTS IN OR RELATING TO FLUID PRESSURE BRAKE MECHANISMS

(71) We, COMPAGNIA ITALIANA WESTINGHOUSE FRENI E SEGNALI, an Italian Body Corporate, of 20 Via Pier Carlo Boggio, Turin, Italy, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a fluid pressure brake mechanism for example for a railway vehicle, incorporating a fluid conveying duct system including a ducted body. Such bodies usually comprise a metal casting with internal ducts formed *in situ* upon casting by cores of suitable shape made of siliceous material previously sintered in a furnace and then placed in a mould before casting.

After casting the siliceous cores are removed with suitable tools, and the internal ducts thus formed are then cleansed of extraneous materials which may be adhering to their walls.

When the ducts which must be made in the casting are complex and tortuous, the casting demands considerable skill on the part of the casting operative, both for forming the requisite cores and in the positioning of the cores prior to casting.

The placing of the cores in position also requires special care in order to avoid shifting during casting, which may cause a decrease in thickness of some of the internal duct walls and an increase in the thickness of other duct walls relative to the planned dimensions thereof, possibly leading to blow-holes in the casting.

The entire preparation for the casting of such known ducted bodies is especially difficult when forming ducted bodies for use in modern pneumatic braking systems for railway vehicles, in which the large number of internal ducts or passages usually require to achieve the various pneumatic circuits increases the difficulty of the work, entailing as it does a high degree of specialisation on the part of skilled personnel, considerable time for precise execution, and consequently a relatively high production cost of the casting.

[Price 25p]

According to the present invention there is provided a fluid pressure brake mechanism for example for a railway vehicle, incorporating a fluid conveying duct system including a ducted body comprising two separate plates secured together at least with the aid of sealing means with abutting surfaces of the plates in fluid tight relationship, both of such surfaces being formed with one or more grooves, each groove being in register with a groove in the other abutting surface so as to define a duct of said fluid conveying duct system.

If it is desired to form a complex duct system it suffices simply to make a two-dimensional arrangement of cores for the purpose of forming the necessary grooves in the plates, and in general such casting is easy to carry out.

The ducted body may be produced not only by casting metal plates in earth moulds, but the plates may be formed by chill casting, casting under pressure, or by stamping sheet metal in a plastics state. In the last two cases the cost of manufacture is further reduced.

For a better understanding of the invention reference will now be made by way of example to the accompanying diagrammatic drawings, in which:—

Figures 1 and 2 show in cross section and in plan respectively one elementary form of ducted body;

Figure 3 shows in cross section another ducted body;

Figure 4 shows in cross section a modification of the ducted body of Figure 3.

In Figures 3, 4 and 5 the same reference numerals are used to designate the same or corresponding component parts.

The ducted body shown in Figures 1 and 2 consists of two separate plates 1 and 2 held together by bolts 3, 4, 5 and 6 and having flat inner abutting surfaces which are also held together by means of a suitable fluid-tight sealing compound such as a jointing or adhesive. Possibly, the plates 1 and 2 could be both held together and sealed by the use of a very powerful modern adhesive

between the plates 1 and 2, such as an adhesive of the kind employed in aeronautical construction in such a way as to allow the bolts to be dispensed with.

5 Upon the facing inner surfaces of the plates 1 and 2 two respective grooves are formed, the groove in the plate 1 being referenced 7, 7a, 7b and the groove in the plate 2 being referenced 8, 8a, 8b. The  
10 groove 7, 7a, 7b communicates with the atmosphere through an opening 9 in the plate 1 and the grooves 8, 8a, 8b communicates with the atmosphere through an opening 10 in the plate 2.

15 The two grooves 7, 7a, 7b and 8, 8a, 8b are complementary, so that they cooperate to form an internal duct for the flow of fluid between the openings 9 and 10 when the plates 1 and 2 are sealed together as shown  
20 in Figure 1.

The ducted body illustrated in Figure 3 consists of a pair of plates 101, 102 which are held together forming a fluid-tight face-to-face seal in a manner similar to that described with reference to Figures 1 and 2.  
25 The plates 101, 102 are provided upon their inner faces with sets of grooves references, respectively, 11, 12, 13, 14, 15 and 16, 17, 18, 19, 20. The plates 101, 102 are held  
30 together by bolts 21, 22.

To the external surfaces of the plates 101, 102 there are affixed, by means of bolts 23, three casings 24, 25, 26 each containing a valve device these being reference 27, 28, 29  
35 respectively, and each being fluid-tightly sealed to the respective plates 101, 102.

The valve device 27 is connected to the grooves 13, 14 through respective apertures 30, 31 in the plate 101, the valve device 28  
40 is connected to the grooves 16, 17 through respective apertures 32, 33 in the plate 102, and the valve device 29 is connected to the groove 20 through an aperture 34 in the plate 102. Additionally the valve device 29  
45 communicates with the outside atmosphere through an aperture 35 (shown in broken outline) in the plate 102, a pair of mating grooves 36 and 37 in the two plates 101, 102, and an aperture 38 in the plate 101.

50 In the ducted body illustrated in Figure 3 the valve devices 27, 28, and 29 can control inter communication between the internal ducts formed by the cooperating grooves, and communication between these ducts and the  
55 atmosphere.

In the variant shown in Figure 4, the valve devices 27, 28 and 29 are contained in recesses formed in respective cover plates 39, 40 applied to the external surfaces of the plates 101 and 102 and sealed fluid-tightly thereto, the four plates 101, 102, 39 and 40  
60 being held together fluid-tightly by means of bolts 121, 122 or by other means such as adhesive, as described above.

65 The plate 39 is furnished with an aperture

41 for communication with the atmosphere, (shown in broken outline) communicating with the aperture 38 in the plate 101.

In the variant shown in Figure 5, the valve devices 27, 28 and 29 are contained  
70 within the plates 101, 102 themselves. In particular, the valve device 27 is housed in an external recess in the plate 101 closed by a cover plate 42 secured by means of screws 43, to the plate 101, while the valve devices  
75 28 and 29 are housed in two respective recesses in the exterior of the plate 102 closed by a common cover plate 44 secured to the plate 102 by means of the same bolts 21, 22 as those used for holding the two plates 101  
80 and 102 together.

The internally ducted bodies described above can be incorporated in various different fluid pressure brake mechanisms for railway vehicles, for example in mechanisms  
85 which are pneumatically operated.

In particular, such internally ducted bodies can be incorporated in distributors for automatic railway pneumatic braking systems, either of the type known as direct  
90 release or the gradual release type.

The word "plate" is used herein simply to describe the two members which when coupled together form the internally ducted body. The word duct should not therefore  
95 be constructed so as to include only members with flat and parallel faces as shown, by way of example, in the drawings: in fact members of curved, angular or indeed of any other shape may be used so long as they  
100 have cooperating faces with grooves, which when placed together form the requisite internal ducts, each duct being provided by a pair of grooves in register with one another.  
105

#### WHAT WE CLAIM IS:—

1. A fluid pressure brake mechanism for example for a railway vehicle, incorporating a fluid conveying duct system including a ducted body comprising two separate plates secured together at least with the aid of sealing means with abutting surfaces of the plates in fluid tight relationship, both such surfaces being formed with one or more  
110 grooves, each groove being in register with a groove in the other abutting surface so as to define a duct of said fluid conveying duct system.

2. A mechanism as claimed in claim 1, in which ducts of said duct systems communicate with through openings in the plates.

3. A mechanism as claimed in claim 1 or 2, in which the external surfaces of the plates are provided with casings which are  
125 secured to such surfaces and into which said openings debouch.

4. A mechanism as claimed in claim 1 or 2, in which ducts of the duct system are interconnected internally of the plates.  
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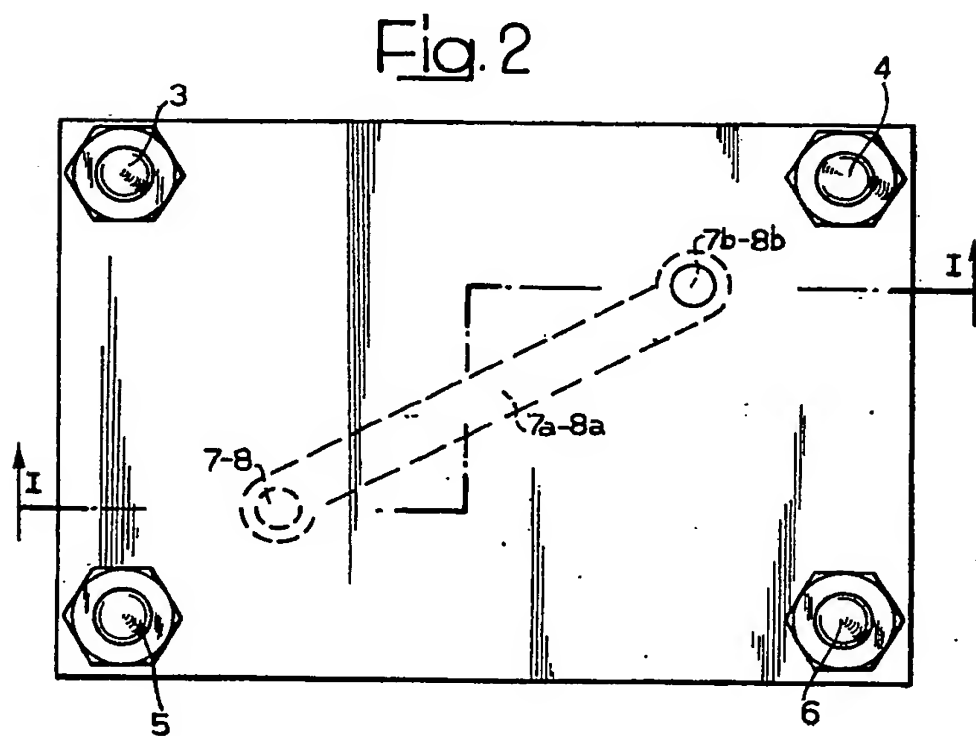
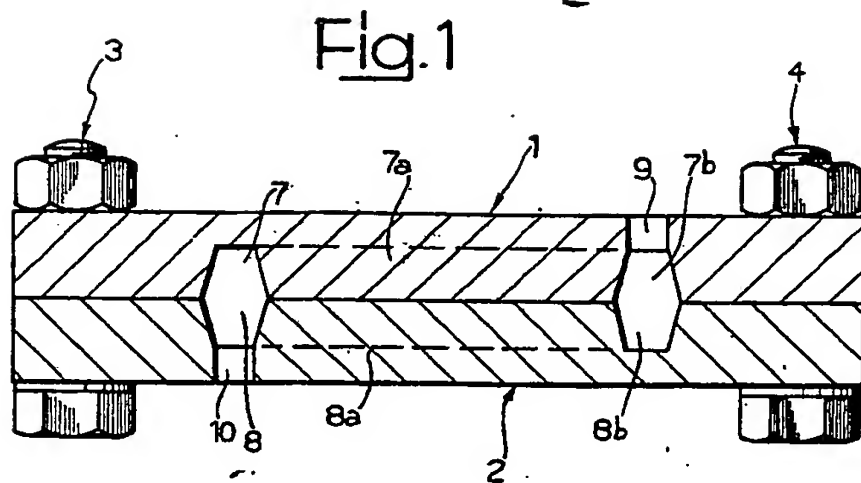
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5. A mechanism as claimed in any one of the preceding claims, in which ducts of the duct system can be placed in communication with one another through control valves positioned on the plates. 5
6. A mechanism as claimed in claim 5, in which said valves are disposed in recesses in further plates secured to said two separate plates. 10
7. A mechanism as claimed in any one of the preceding claims, when included in a pneumatic brake system for a railway vehicle. 15
8. A mechanism as claimed in any one of claims 1 to 6, in which said body is comprised in a distributor of a pneumatic brake system for a railway vehicle system being of the direct release type or of the gradual release type. 20
9. A fluid pressure brake mechanism for a railway vehicle, incorporating a fluid conveying duct system including a ducted body substantially as hereinbefore described with reference to any one of Figures 1, and 2, or Figures 3, 4 or 5 of the accompanying drawings. 25

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Fig. 3

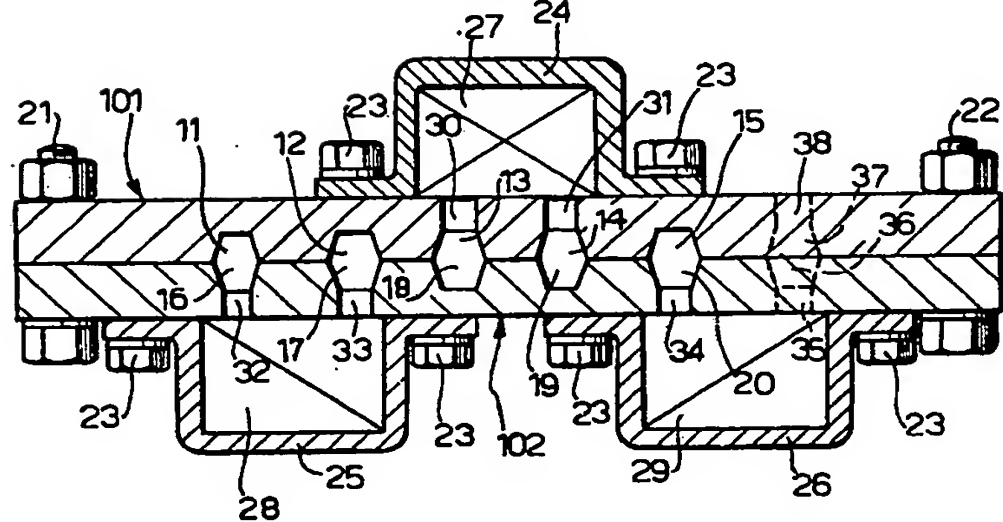
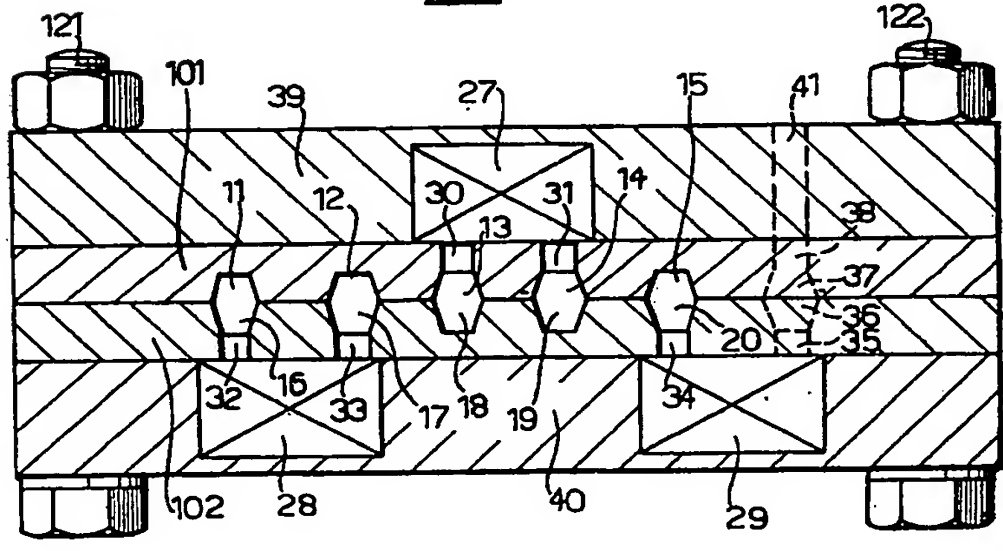


Fig. 4



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Fig. 5

